ENCODING/DECODING AUDIO AND/OR SPEECH SIGNALS BY TRANSFORMING TO A DETERMINED DOMAIN

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of U.S. patent application Ser. No. 11/941,249, filed on Nov. 16, 2007, which claims priority from Korean Patent Application No. 10-2006-0114102, filed on Nov. 17, 2006, in the Korean Intellectual Property Office, the disclosures of which are incorporated herein in its entirety by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the General Inventive Concept

[0003] The present general inventive concept relates to a codec, and more particularly, to a method and apparatus for encoding and decoding a speech signal and/or an audio signal.

[0004] 2. Description of the Related Art

[0005] Conventional codecs are categorized into a speech codec and an audio codec. The speech codec is mainly used to encode or decode a signal corresponding to a frequency band ranging from 50 Hz to 7 kHz by using a speech utterance model. In general, the speech codec performs encoding and decoding by extracting parameters that represent a speech signal by modeling vocal cords and vocal intensities. The audio codec is mainly used to encode or decode a signal corresponding to a frequency band ranging from 0 Hz to 24 Hz by applying a psychoacoustic model, e.g., high-efficiency advanced audio coding (HE-AAC). The audio codec generally performs encoding and decoding by omitting low-sensitivity signals by using human auditory characteristics.

[0006] However, it is difficult to efficiently perform encoding and decoding of both a speech signal and an audio signal by using only one of the speech codec and the audio codec. The speech codec is suitable for encoding or decoding a speech signal but if it is used to encode or decode an audio signal, the quality of sound is degraded. If the audio codec is used to encode or decode an audio signal, the compression efficiency is good but if it is used to encode or decode a speech signal, the compression efficiency is degraded. Thus, there is a growing need for development of a method and apparatus for encoding or decoding a speech signal, an audio signal, or a mixed signal of a speech signal and an audio signal while improving the quality of sound with a small number of bits.

SUMMARY OF THE GENERAL INVENTIVE CONCEPT

[0007] The present general inventive concept provides a method and apparatus to efficiently encode and/or decode a speech signal and/or an audio signal.

[0008] Additional aspects and utilities of the present general inventive concept will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the general inventive concept.

[0009] The foregoing and/or other aspects and utilities of the present general inventive concept may be achieved by providing a method of encoding a signal, the method including transforming an input signal into at least one domain, determining a domain to be encoded using the input signal or the transformed signal in predetermined units, and encoding signals allocated to the units in the determined domain.

[0010] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing a method of encoding a signal, the method including determining one or more domains in which an input signal is to be encoded in predetermined units, and transforming signals allocated to the predetermined respective units into the determined domains, and then encoding the transformed signals.

[0011] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing a method of decoding a signal, the method including determining a plurality of domains in which signals for predetermined units have been respectively encoded, respectively decoding the signals in the determined domains, and restoring the original signal by mixing the decoded signals together.

[0012] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing an apparatus to encode a signal, including a transforming unit to transform an input signal into at least one domain and to determine a domain to be encoded using the input signal or the transformed signal in predetermined units, and an encoding unit to encode signals allocated to the units in the determined domain.

[0013] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing an apparatus to decode a signal, including a demultiplexing unit to determine a plurality of domains in which signals for predetermined units have been respectively encoded, and a decoding unit to respectively decode the signals in the determined domains, and a transforming unit to restore the original signal by mixing the decoded signals together.

[0014] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing an apparatus to encode and/or decode a signal, including an encoder to transform an input signal into at least one domain and to determine a domain to be encoded using the input signal or the transformed signal in predetermined units, and to encode signals allocated to the units in the determined domains, and a decoder to determine the determined domain in which the encoded signals are allocated, to respectively decode the signals in the determined domains, and to restore the input signal by mixing the decoded signals together.

[0015] The foregoing and/or other aspects and utilities of the present general inventive concept may also be achieved by providing a computer-readable medium containing computer-readable codes as a program to execute a method of transforming an input signal into at least one domain, determining a domain to be encoded using the input signal or the transformed signal in predetermined units, and encoding signals allocated to the units in the determined domain, and/or a method of determining a plurality of domains in which signals for predetermined units have been respectively encoded, respectively decoding the signals in the determined domains, and restoring the original signal by mixing the decoded signals together.